

ABSTRACT OF THE DISCLOSURE

An electromagnetic telemetry system for transmitting data from a downhole assembly, which is operationally attached to a drill string, to a telemetry receiver system. The data are typically responses of one or more sensors disposed within the downhole assembly. A downhole transmitter induces a signal current within the drill string. The signal current is modulated to represent the transmitted data. Induced signal current is measured directly with the telemetry receiver system. The telemetry receiver system includes a transformer that surrounds the path of the current, and an electromagnetic current receiver. The transformer preferably comprises a toroid that responds directly to the induced signal current. Output from the transformer is input to an electromagnetic current receiver located remote from the downhole assembly and typically at the surface of the earth. Alternately, voltage resulting from the induced signal current can be measured with a rig voltage receiver and combined with the direct current measurements to enhance signal to noise ratio.